HEFS-1.0.1 Release Notes

Release Date: 9/23/2013
Release Type: Scheduled
HEFS Build: 1.0.1
Build and Package Date: 9/18/2013
Tested against FEWS Binary: 2012.02 build 39282 (patched from 38987)

Introduction

This document contains release notes for HEFS-1.0.1.

IMPORTANT: Your version of GraphGen needs to be migrated to the new file system based approach for reading products and settings files. **GraphGen will not function if you do not do this.** See FBz 1117 for more details. The document containing the steps for migrating GraphGen to the new products and settings will be released as part of CHPS-4.0.1. However, a version of the *Graphics Generator Install Guide* can be found attached to FBz 1078.

Though parameters may need to be re-estimated, the EnsPostPE and MEFPPE *parameter estimation standalone(s)* used for the previous release can be used for this release. This will save time importing data. Follow the install notes to update the binary files used for those standalones to the new release. If configuration changes since the last release are significant (e.g., new forecast points are added), necessitating that the *parameter estimation standalone(s)* be reconstructed, then see Section 5.1.1 of the EnsPost and MEFPPE configuration guides for instructions on porting over the run areas from the old standalone to the new standalone. When parameter estimation is completed for this release, save your standalone(s) in case parameters need to be re-estimated.

Below are two tables of the fixes and enhancements in this release. Following that is a list of changed documentation. Following that the fixes and then enhancements are described in greater detail.

The HEFS Test RFCs are expected to test existing, fixed and new HEFS functionality. The Test Manual provided in this release specifies what testing is expected from each RFC and contains the test procedures for many tests.

Fixes

FogBugz ID	Reported By	Title
1086	CBRFC	Displaying GEFS grids for CONUS
1091	CNRFC	GDS Exception Error
1093	CNRFC	MEFPPE Explorer Plugin Error
1094	CNRFC	Model Import Time Period
1106	CNRFC	MEFPPE Parameter Estimating Error
1113	ABRFC	MEFPPE cannot read TAMN/TAMX files
1118	NERFC	Updates to non-software related files delivered with HEFS-0.3.2
1119	CBRFC	jar file missing from tarball (affects EnsPostPE and MEFPPE)
1124	CNRFC	Unable to calculate parameters
1133	ABRFC	MEFP RFC QPF seems unrealistic
1146	ABRFC	Slowness caused by adding MEFP to MergeMap
1150	CNRFC	MEFP performance issues at CNRFC

1166	MARFC	Bias in TMIN/TMAX data from 1-deg GEFS reforecasts
1186	CBRFC	MEFPPE Default Estimation parameters
1195	CNRFC	MEFP Temperature Issue
1202	OHD	Cleanup CFSv2 LaggedEnsemble.xml module files to remove WARNINGS messages
1209	OHD	Error applying EnsPost parameters

Enhancements

FogBugz ID	Requested By	Title
1157	OHD	Modify MEFPPE to allow easier detecting of "bad" historical observed data (e.g. missing values, negative precip, TMIN > TMAX)
1158	OHD	Modify MEFPPE to identify questionable MEFP parameter values (insufficient data, negative correlations)
1159	OHD	Modify ENSPOST to add an option to output daily, instead of disaggregated, post-processed flows
1191	OHD	List of EnsPost PE enhancements for HEFS 1.0.1
1200	OHD	Adding run file property to MEFP adapter for specifying member indexing year
1205	OHD	Using FEWS transformations to MERGE historical data with MEFP output
1213	OHD	List of MEFP and MEFPPE Small Enhancements for HEFS Release 1.0.1

Documentation

The following pieces of documentation have been added or modified since the last release and can be found in the 'documentation' directory at the root of the package.

- *Added:*
- *Modified:* ../release/users_manuals/MEFP_Users_Manual.docx
- *Modified:* ../release/install_notes/MEFPPEConfigurationGuide.docx
- *Modified:* ../release/install_notes/MEFPConfigurationGuide_Forecast.docx

Notes

Fix: Fogbugz 1086 – Displaying GEFS grids for CONUS

Description

The current Grids.xml definition of HEFS_GEFS_USA cut-off the lower parts of Texas and Florida due to the <y> value being too large.

Cause

In the Grids.xml file, the <y> value was too large for <regular locationId='HEFS_GEFS_USA'> to render.

Fix

The <y> value was changed from 56 to 50.

Fix: Fogbugz 1091 – GDS Exception Error

Description

There was an issue connecting to the site where GEFS files reside. After re-launching CHPS to fix this error, the database connection was not established.

Cause

HEFS tmp files were filling up disk space and not being cleaned up due to sharing filenames with previously downloaded files in the tmp directory. In turn, this caused issues connecting and downloading the GEFS files.

Fix

The source code was updated to correctly remove temporary files in the tmp directory.

Fix: Fogbugz 1093 – MEFPPE Explorer Plugin Error

Description

The user killed CHPS after it was taking a long time to view historical CFSv2 forecasts in the MEFPPE graphical window. Ever since, the MEFPPE GUI has not been able to successfully launch.

Cause

The error was caused by CHPS being killed before MEFPPE runtime information was successfully saved.

Fix

The run-time information file located in mefppeRunArea/./systemFiles/runTimeInformation.xml was removed. The canonical event files were reimported, and changes made previously in the MEFPPE estimation options were redone. A code change was made so that whenever the run-time information is written, it is first written to a temporary file off to the side and then copied into place when done. Thus, if CHPS crashes while writing the file, the incomplete file will not be used as it would not have been copied into place. This change should lessen the chance of this problem occurring in the future, though it may not completely eliminate it.

Fix: Fogbugz 1094 – Model Import Time Period

Description

The downloaded GEFS and CFSv2 model data does not appear to span from 1979-2010 when viewed through the MEFPPE diagnostic panel.

Cause

The start and end years of GFS, GEFS, CFSv2, RFC, and Climatology forcing data are different.

Fix

Default ranges for GFS, GEFS, CFSv2, RFC, and Climatology were updated to reflect proper ranges.

Notes

The proper ranges for the forcing data are reflected below:

- **RFC** – RFC specific
- **GFS** – 1979 to 2006
- **GEFS** – 1985 to 2012
- **CFSv2** – 1982 to 2010
- **Climatology** – RFC specific

Fix: Fogbugz 1106 – MEFPPE Parameter Estimating Error

Description

An error was encountered when attempting to estimate any precipitation parameters in the Estimation Steps panel.

Cause

The minimum number of required observations was set at 500, but the number of CFSv2 reforecasts available was 348.

Fix

The code was changed to require a minimum of 340 observations.

Notes

Parameter estimation for both temperature and precipitation will error out in the same manner if parameters are not estimated for any forecast sources for any reasons

Fix: Fogbugz 1113 – MEFPPE cannot read TAMN/TAMX files

Description

MEFPPE could not find TMAX and TMIN files that were successfully generated.

Cause

Idmapping at the PI Config file was pointing to the wrong Id map.

Fix

The existing PI configuration file was used instead of the delivered one that did not point to importdatacard for MAP unusable file in the historical directory was deleted. The code was changed to discard any time series headers pulled from the PI-service that did not have an unused time series (i.e., those that are not MAP, TMIN, or TMAX).

Fix: Fogbugz 1118 – Updates to non-software related files delivered with HEFS-0.3.2

Description

OHD has updated non software related files that were delivered with HEFS-0.3.2.

Cause

Since the release of HEFS-0.3.2, necessary updates were made to the HEFS documents and Config files.

Fix

Updates were made to HEFS documents and Config files and delivered to HEFS RFCs via FogBugz.

Fix: Fogbugz 1119 – jar file missing from tarball (affects EnsPostPE and MEFPPE)

Description

A jar file (jpedal_lgpl.jar) missing from the hefsPlugins prevented the help function from running from EnsPostPE and MEFPPE.

Cause

jpedal_lgpl.jar was not in the correct directory in the install package.

Fix

The jar file was copied from the hefs/bin directory to the hefs/hefsPlugins directory.

Fix: Fogbugz 1124 – Unable to calculate parameters

Description

The user was unable to calculate MEFP parameters in the RFC forecast estimation process.

Cause

If the first and last days of a year for which parameters could be computed were the same, a java index out of bound exception (without the exception message) was encountered due to a logic problem.

Fix

The code was changed to account for this unique situation.

Fix: Fogbugz 1133 – MEFP RFC QPF seems unrealistic

Description

RFC QPF-based MEFP produced unrealistic values. Across the basin QPF is in the 1.5-2 inch range. However, all traces are less than .75 inches. This would put the deterministic QPF and resulting flow traces outside of the ensemble bounds.

Cause

If the units were not defined ("units = null") in MEFPPE generated RFC forecast and observation files (e.g. rfc_pfcst06, rfc_pobs06 data files), the RFC data will be processed in metric units ('mm' instead of 'in' for precipitation).

The *MEFP User's Manual* has a mistake indicating that the default unit for precipitation is 'in'.

Fix

MEFPPE program was modified to write default 'units = in' for precipitation and 'units = degf' for temperature into generated RFC forecast and observation data files. The *MEFP User's Manual* was corrected.

Fix: Fogbugz 1146 – Slowness caused by adding MEFP to MergeMap

Description

Adding MEFP to MergeMaps caused the module to slow to 10x their original speed.

Cause

The relativeViewPeriod value in the COLORADO_MergeMAP_Forecast.xml.hefs looked for historical time series starting from -36500.

Fix

The relativeViewPeriod value was changed from -36500 to -10.

Fix: Fogbugz 1150 – MEFP performance issues at CNRFC

Description

CNRFC noticed slowness when running MEFP for all 302 locations. Early signs show slowness in the MEFP_FMAT_Forecast module.

Cause

The configurations were not optimized.

Fix

The MEFP configuration files were modified to execute the MEFP_MAT_Forecast module (which converts all TFMN/TFMX data to FMAT forecast data) as an ensemble and take use of the multi-core option within FEWS.

Fix: Fogbugz 1166 – Bias in TMIN/TMAX data from 1-deg GEFS reforcasts

Description

TMIN and TMAX from 1-deg GEFS reforecasts for some locations in CN and MA show noticeable difference from observed values.

Cause

MEFPPE was reading the TMIN file and assigning it to TMAX; the TMAX file was read in as TMIN data.

Fix

The code was changed to assign the TMAX and TMIN in MEFPPE correctly.

Fix: Fogbugz 1186 – MEFPPE Default Estimation parameters

Description

With the previous release, the only way to recover original default estimation option settings within the Estimation Options panel of the MEFPPE is to manually make the change. However, the default option settings are not made obvious in the release of MEFPPE.

Fix

Default options can be found in the delivered jar files (see the FogBugz for more information). However, this release includes a **Default Button** for each individual control option to the right of the option editing field. The button can be clicked at any time to recover the delivered default value for that option, so knowing the default options beforehand is no longer necessary.

Fix: Fogbugz 1195 – MEFP Temperature Issue

Description

The GEFS forecast temperatures are too warm, and using new recalibrated MEFP parameters does not change the output.

Cause

GEFS TFMN computation in MEFP_GEFS_TFMN_6to24.xml is incorrect.

Fix

TMAX was changed to TMIN in the expression for calculating GEFS TFMN in MEFP_GEFS_TFMN_6to24.xml

Notes

MEFP_CFSv2_TFMN_6to24.xml also changed to calculate the TMIN correctly.

Fix: Fogbugz 1202 – Cleanup CFSv2 LaggedEnsemble.xml module files to remove WARNINGS messages

Description

Unnecessary warning messages were observed when executing the MEFP workflow.

Cause

A few lines in /ModuleConfigFiles/hefs/FDGroup/*MEFP_CFSv2*_LaggedEnsemble.xml were creating unnecessary warning messages.

Fix

The problematic lines were deleted from /ModuleConfigFiles/hefs/FDGroup/*MEFP_CFSv2*_LaggedEnsemble.xml

Fix: Fogbugz 1209 – Error applying EnsPost parameters

Description

There was an issue with how EnsPost selects a set of parameters and applies them. It was not using the correct set of parameters/CDFs when applying the error model.

Cause

When attempting to apply the errorModel to values in the ensemble, the incorrect parameters/CDFs were being used.

Fix

The algorithm was fixed so that it would use the correct parameter/CDFs when looping to the next trace in the ensemble.

Enhancement: Fogbugz 1157 – Modify MEFPPE to allow easier detecting of "bad" historical observed data (e.g. missing values, negative precip, TMIN > TMAX)

Description

"Bad" historical observed MAP/MAT can lead to "bad" MEFP results. The Diagnostics Panel of the MEFPPE has been enhanced to display light red lines or zones on plots of time series data showing where questionable values can be found. Checks performed include missing data, gross range checks, negative precipitation data, and minimum temperature exceeding maximum temperature. Graphics Generator tools have also been enhanced to display cells with questionable data in the data table with a light red background, allow for selecting questionable cells in the data table to draw crosshairs marking the value on the plot (and vice versa), and to draw marks next to the scrollbars indicating the position of questionable data within the table. These new features apply to historical data and RFC forecast and observed data.

Enhancement: Fogbugz 1158– Modify MEFPPE to identify questionable MEFP parameter values (insufficient data, negative correlations)

Description

Diagnostic displays have been added for the purpose of QC'ing estimated MEFP parameters. Diagnostics include a block plot that displays parameter values according to a color scale against the canonical event and day-of-year for which the parameter was estimated. An event and day-of-the-year that yielded a questionable parameter value are marked by x's and include a tool tip (visible by leaving the mouse cursor motionless over the parameter value's block for a couple seconds) explaining why the parameter value is considered questionable. Reasons may include small sample size, missing data, and a negative correlation coefficient. A panel on the right allows for selecting the parameter to display and canonical events to include in the plot. The data can also be viewed as a table displaying the numerical values of the parameters with each cell having a background color matching the corresponding block's color in the plot.

Enhancement: Fogbugz 1159 – Modify ENSPOST to add an option to output daily, instead of disaggregated, post-processed flows

Description

As a possible solution to FogBugz 1002, EnsPost was modified to optionally produce daily post-processed flows (i.e not disaggregated). If configured this way, the user could then use a follow-on FEWS disaggregation transformation to produce flows at the required time step.

Fix

A new run-file property has been added called disaggOutput. When set to true, it'll disaggregate the output normally. When set to false, it will not disaggregate the output. It is an optional property, and, when it is not set by the user, the default behavior is to disaggregate the output. When set to true, a TimeStep ID of "12Z" must be set in the importActivities section of the EnsPost Module.F.

Enhancement: Fogbugz 1191 – List of EnsPost PE enhancements for HEFS 1.0.1

Description

List of items proposed:

1. Add an option to choose the period of record for estimation of parameters. This option avoids the need to trim down or modify files of observed and simulated flows in case if a subset of the entire period of the record is to be used for the calibration (the option already exists in CHPS/FEWS). It should be noted that this affects both EnsPostPE and MEFPPE.

2. Added a feature to pop up a diagnostic console window which displays the seasons, months, cutoff values, and error measures at the completion of the PE run for every location that the PE is run for.

3. Add a feature to interchange y-axis units from cfs to cms for the time series plot displayed in the diagnostic panel.

4. Modify default values of the parameters under 'advanced options' on the Estimation Options panel.

5. Fix the empirical CDF computation (i.e., as per the current scheme different probabilities are assigned to a same values, which is not possible and needs to be corrected).

Enhancement: Fogbugz 1200 – Adding run file property to MEFP adapter for specifying member indexing year

Description

A run file property was added to the MEFP adapter to allow the user to control whether hydrologic water years, calendar years, or a custom year will be used in assigning time periods to member indices.

Fix

The memberIndexingYear property was added and it will default to 'standardHydroWaterYear'. A description has been provided in the MEFP User's Manual.

Enhancement: Fogbugz 1205 – Using FEWS transformations to MERGE historical data with MEFP output

Description

With HEFS-1.0.1, OHD will provide guidance on using FEWS transformations to fill in the portion of the ensemble using climate data. This is intended to replace using MEFP to produce the climate portion of the time series.

Cause

When MEFP is used to produce the climate portion of the forecast time series, the temperatures are modified slightly.

Enhancement: Fogbugz 1213 – List of MEFP and MEFPPE Small Enhancements for HEFS Release 1.0.1

Description

Small enhancements released in HEFS-1.0.1 and not parts of another FogBugz case are as follows:

- Removed modulation events from the default canonical events list. This will only affect new installations of the MEFPPE. Existing installations will continue to use the canonical events most recently used in parameter estimation. Existing parameter files that include modulation events are still usable.

- <source>ExcludeModulationEvents run file property has a default value of 'true' for all forecast sources (previous release used false, so that modulation events were included in execution). This means only base events are used by default. <u>This will impact output from MEFP operational forecasting and hindcasting upon installation, reducing the likelihood of discontinuities in the output, particularly noticeable when generating long-range temperature ensembles</u>. See the *MEFP User's Manual* Section 4.4.3 for more information on this property.

- Added behaviorIfEventMissing run file property. By default, it is set to 'errorOut' so that if data is missing from a forecast source input time series (or lagged ensemble) preventing it from computing a canonical event, then the MEFP adapter will error out. This is a change in behavior from the previous release; to behave as the previous release, set its value to 'fillClimatology'. See the *MEFP User's Manual* Section 4.4.3 for more information on this property, including the other setting option 'fillMissing'. Note that for CFSv2, an event is computable if the data required to calculate the event is not missing for at least one ensemble member within the provided lagged ensemble; the data need not be present for all members. Hence, the change to 'errorOut' from previous behavior equivalent to 'fillClimatology' is not expected to prevent CFSv2 from running in nearly all cases.

- Made the CFSv2 pairing window function in an identical way with other sources, making use of the estimation option "... Width of Data Window in Days" (see the **Estimation Options Panel**). Previously, the width was fixed to 63 days for the CFSv2 data source.

- Various small if-checks were removed or added in order to fix issues with performance of MEFP and discontinuities in the output. They will not be listed individually.

- Historical data now stored in a binary format, as well as XML format, within the parameters tar file. This can lead to a reduction in run-time of the MEFPEnsembleGeneratorModelAdapter by up to 20%.